the present day. As examples we would point especially to his masterly accounts of *Ptyodactylus hasselquistii* and *Chalcides ocellatus*, which may be recommended for study to any who should still doubt the derivation of what are called species, or who, unable to devote themselves to original investigation of this kind, and influenced by statements of ignorant or prejudiced writers, persist in looking upon species as definite units in nature. In these examples we see how forms that are so different in their extremes, in size, scaling, and coloration combined, that one would unreservedly refer them to distinct species, are connected by such insensible gradations that it is with the greatest difficulty, and only by drawing arbitrary limits, that we are able to break up the series into a number of varieties; and how these chains of varieties correspond with the direction of definite lines of geographical distribution. In order to render the degree of individual variations more readily intelligible, long lists of measurements and tabulations of details of lepidosis are appended; these tables will prove of lasting value, from the care and completeness with which they have been drawn up.

It is only to be regretted that this exhaustive treatment of variations outside the limited range of Egypt has not been carried out through the whole work, as it would have yielded highly interesting results in the case of *Latastia longicaudata*, *Eumeces schneideri*, *Mabuia quinquetaeniata*, *Naia nigricollis*, and *Bufo regularis*. In fact, a little inconsistency in the general plan—some families being characterised whilst others are not—together with the omission of anatomical details which an author so well qualified to deal with these matters might have been expected to furnish, are among the few defects we notice in this admirable work.

The coloured plates, forty in number, mostly the work of Mr. P. J. Smit, equal, if some do not even surpass, the best that have ever been published of a group of animals particularly difficult to depict in life-like attitudes. We would specially commend, as high examples of artistic skill combined with scrupulous attention to details, pls. xiv. (*Uromastix aegyptius*), xxix. (*Chamaeleon vulgaris*), and xxxviii. (*Zamenis diadema*). Numerous black plates and figures in the text, drawn by Messrs. J. Green, Smit, and Groenvold, complete the illustrations, one specimen at least of every species known from the area dealt with being represented.

The introduction, dealing with the physical features of the region, is illustrated by a series of exceedingly beautiful photographs in electrotype, as well as by a map showing all the localities whence the specimens described were obtained.

Appearing at the moment when the whole nation is rejoicing over the re-establishment of Anglo-Egyptian rule beyond the limits of Egypt proper, this first instalment of a work on a fauna too much neglected since the days of the famous French expedition, will be especially welcome. It is therefore to be regretted, in view of the increased interest which will no doubt henceforth be taken in the natural history of Egypt, that the small number of the issue—100 copies only—will render the circulation of the book more limited than it deserves.

G. A. BOULENGER.

A BOOK WITH TWO NAMES.

Quick and Easy Methods of Calculating. A Simple Explanation of the Theory and Use of the Slide-Rule, Logarithms, &c. With numerous Examples worked out by Robert Gordon Blaine, M.E, Assoc.M.Inst.C.E., &c. (London: E. and F. N. Spon, Ltd. New York: Spon and Chamberlain, 1898.)

THE author makes his title, "Quick and Easy Methods of Calculating"—at least, that is all that is in large print on the title-page; but the binder calls it, on the outside of the book, "The Slide-Rule." The binder is right. The author gives a very short account of some methods of shortened arithmetic, in which he points out that it is unnecessary to work out the results of an observation with very great or unlimited accuracy when the observation itself is subject to well-known possible errors. He might have traced the connection between the desired accuracy of the arithmetic and the probable accuracy of the observation as dependant on its form, but he has not. There is a simple non-algebraical and very clear explanation of logarithms; then the real object of the book, an explanation of the slide-rule, follows. As in all explanations of the slide-rule that are published, however clear and obvious they may be to the user of the slide-rule, there is, of necessity perhaps, such an amount of detail and of rule as to possibly scare any would-be user of this invaluable instrument with the fear that he could not hope to remember it all. The writer of this notice has always felt that this difficulty can only be overcome by half an hour's personal explanation, in which case a book becomes unnecessary; however, for those who cannot meet with this personal assistance, the little book before us is clear, logical and accurate. A great number of examples, mainly derived from the engineering laboratory, are given, which serve both to show the great scope of the slide-rule and as exercises in its use.

By way of criticism, the writer would point out that to find cube roots it is preferable to use the slide inverted to set 1 on C against the cube on A, and find at what part of ᗺ and D identical readings face each other. Any reading except 1 can be found twice on A, and three places on ᗺ and D can be found for the cube roots of *n* 10*n* and 100*n*. The rule that the writer has always given in order to know where to read is as follows: If the cube has 1 (4, 7, &c.) digits the cube root will be found on D to the left of the left possible setting on A. If it has 2 (5, 8, &c.) digits the cube root will be found on D between the possible settings on A, and if 3 (6, 9, &c.) it will be found on D to the right of the right setting on A. This very simple rule has the advantage of never failing. Unfortunately the rule, as given by the author for the less convenient method with the slide not inverted, does not answer, except by chance, for the example he himself gives to illustrate it; for, according to this rule, $\sqrt[3]{638} = 8{\cdot}6 +$ (as given without the + by the author) or $= 1{\cdot}855$, but this is really $= \sqrt[3]{6{\cdot}38}$.

The writer has always felt that though rules for the number of digits may be worth formulating, they are not worth using or remembering; also that the memory is needlessly taxed by any system of instruction such as is

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given in the book under notice, even though the principles are perfectly explained, where every different operation has the necessary setting of the rule explained or expressed by a diagram as a different setting or operation. If once the common rule applying to all logarithmically divided scales, whether of numbers, their powers, or of trigonometrical functions, whether ascending together or some inverted, is made clear, the sixth or slide-rule sense has a chance of being developed, and then there is no occasion to remember rules any more.

The author does not mention even the existence of a P line in some rules, which make calculation with fractional indices, or indeed indices of any magnitude as quick and direct as simple proportion, nor does he refer to Lanchester's radial cursor, which enables the slide-rule to be employed for calculations on heat engines and thermodynamics generally so that any adiabatic has its coordinates numerically presented, and even entropy is simply presented.

The quick and easy methods of calculating title is belied by there being no mention of any arithmometer.

C. V. B.

TECHNICAL BACTERIOLOGY.

Manual of Bacteriological Technique and Special Bacteriology. By Thomas Bowhill, F.R.C.V.S., F.R.P.S. Pp. xii + 284. (Edinburgh: Oliver & Boyd, 1899.)

THE scope of this manual may be gathered from the following brief summary of its contents:—Introduction; classification and morphology of bacteria; methods of sterilisation. Part i. Principles of bacteriological technique. Part ii. The preparation of nutrient media, and methods of cultivating bacteria. Part iii. Special bacteriology. Part iv. Mould fungi. Part v. Yeast fungi. Part vi. Protozoa or animal parasites.

The first eighty-six pages deal with bacteriological technique, and the author is to be congratulated on having placed the subject before his readers in a clear and concise manner, and in such a way as greatly to facilitate reference. Moreover, there is much that is new, or comparatively new, in this portion of the manual: *e.g.* method for inoculating rabbits for the diagnosis of rabies; Bowhill's method of staining flagella and bacteria simultaneously with orcëin; Roth's method of examining butter for tubercle bacilli; Neisser's method for the differential diagnosis of diphtheria bacillus in cover-glass specimens; points to be observed in describing an organism; inoculation of animals (subcutaneous, intravenous, into the lymphatics, into the serous cavities, &c.), observation of animals after inoculation, and post-mortem examination of animals.

The methods of examining air, water and earth are not treated as fully as might be wished. In examining soil, Fraenkel's method only is described. Fraenkel advocates the direct mixture of the soil with the nutrient gelatin. But the number of bacteria per gramme of surface soil is over one million. Hence to obtain separate colonies it is evident that either an almost imponderable fragment of soil must be used, or else an exceedingly large amount of nutrient material. There can be little doubt that the only practical method is to dilute the soil very largely with sterile water, and to make cultivations from the resulting mixture of soil and water.

Elsner's method for separating *B. coli* and *B. typhi abdominalis* is given, but the phenol-gelatin method, which many observers find more useful, is not described in this section of the work. In Part iii., however, reference is made to the method of separating the typhoid bacillus by carbolising the water, and incubating it with an equal part of sterilised peptone-salt solution, and thereafter making Elsner potato-gelatin plate-cultures. No description appears to be given of the method of filtering large quantities of water through a sterile Pasteur filter, brushing the surface of the filter with a sterilised brush into a few cubic centimetres of sterile water, and from the filter brushing suspension of bacteria and water, making *surface* plate-cultures in phenol gelatin.

The terminology adopted as regards the number and arrangement of the flagella of bacteria, which, as the author states, is borrowed from that applied to the Protozoa, is open to some criticism, and is hardly to be recommended.

The second and most important section of this manual deals with Schizomycetes, Blastomycetes, Hyphomycetes, and Protozoa.

It might be anticipated that a veterinary surgeon of Mr. Bowhill's reputation would give an account of some of the diseases caused by micro-organisms which affect the lower animals, and which are either not described at all, or are described in an imperfect manner in the ordinary text-books of bacteriology. Nor is this hope in vain, for the author writes lucidly and with all the authority of an expert about such diseases as swine fever, swine plague, swine erysipelas, pleuro-pneumonia contagiosa bovis, broncho-pneumonia bovis, grouse disease, &c. Moreover, glanders, diphtheria and tuberculosis, as they affect man and animals, are ably dealt with.

It is to be regretted that the author has given no description of *B. enteritidis sporogenes* (Klein), especially when it is considered that the spores of this anærobic micro-organism are found in the excreta of some of the lower animals, and that it appears to be causally related to acute diarrhœa in man. As the author is well up to date in nearly all respects, we hope to find this omission remedied in a future edition. That a new edition will soon be called for need not be doubted, as there is certain to be a large demand for a work of such sterling merit as this one undoubtedly is.

In the concluding portion of the book—Part vi., Protozoa—an excellent account is given of Texas cattle fever, plasmodium malariæ, &c.

We cannot give unstinted praise to the illustrations. Some, indeed, are very good, but many of the photo-micrographs are disappointing. However much we may welcome the author's orcëin method of simultaneously staining bacteria and their flagella as an aid to the differential diagnosis of bacteria, we cannot, to judge by the results, regard it as a good method where reproduction is aimed at. The author represents *B. coli communis* as multi-flagellated. The true *B. coli communis* has only one to three flagella.

While we have ventured to indulge in a few possibly adverse criticisms, we are careful to conclude with the

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